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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/336,525	06/18/1999	JUDY HUANG	AMAT/3577.X1/PD	7748
32588	7590	03/04/2004	EXAMINER	
APPLIED MATERIALS, INC. 2881 SCOTT BLVD. M/S 2061 SANTA CLARA, CA 95050			PADGETT, MARIANNE L	
			ART UNIT	PAPER NUMBER
			1762	

DATE MAILED: 03/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/336,525	Applicant(s) HUANG, JUDY	
	Examiner Marianne L. Padgett	Art Unit 1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 9/4/03(IDS) & 12/22/03.
 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 24, 26, 30, 31, 33-36, 38, 42, 43 and 45 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) ☐ Claim(s) _____ is/are allowed.
 6) ☒ Claim(s) 24, 26, 30-31, 33-36, 38, 42, 43 & 45 is/are rejected.
 7) ☐ Claim(s) _____ is/are objected to.
 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9/4/03</u> . | 6) <input type="checkbox"/> Other: _____ |

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Supplemental Action

- (1) The after final response (No actual amendment proposed) of 12/22/03 was received, however after the 11/5/03 final rejection was mailed the IDS of 9/4/03 was entered/scanned into the PTO file. As this paper "crossed-in-the-mail" with the 11/5/03 action, this case is being reopened to treat the art cited by applicant, as a supplemental action to the Final Rejection of 11/5/03.
- (2) The cited U.S. application 09/627,667 was not supplied, is not yet scanned (IFW), nor does it have a published application, so can not be reviewed and has thus NOT been considered. The Japanese patents 06-204191 and 61-009579, and French patent 2,712,119 have neither a translation nor any discussion of their relevance, so also have not been considered.
- (3) The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).
A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).
Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).
- (4) Claims 24, 26, 30-31, 33-36, 38, 42-43 and 45 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 25, 30-34, 50-51, 55-61, 65 and 85-90 are of U.S. Patent No. 6,537,733 B2 (Campana et al). Although the conflicting claims are not identical, they are not patentably distinct from each other, because while the patent has details of use or further steps not required by this applications' claims, the

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present claims are more generic, hence broader and encompass the steps of the patent's process claims. For example, the present application's first layer is "comprising silicon carbide", hence is inclusive of any of the N-containing Si carbide layers that are inert gas plasma treated in the patented claims. Also note that the patent claim's silicon oxide or particularly fluorosilicate glass (FSG) read on the claimed second layer of the present application claims.

Note that while there are NO overlapping inventors between this application and the copending patent to Campana et al, both are to the same assignee.

(5) It is noted that as of the 11/18/03 amendment in the copending application 09/902,518, all pending claims of this case now require the use of a nitriding or N-containing gas in their treatment plasma, hence have been differentiated from the present case's claims that require the plasma to be "consisting essentially of an inert gas". Therefore, the Obviousness Double Patenting rejection over 09/902,518, stated in section 3 of paper#23 mailed 11/5/03, & as repeated from section 12 of paper# 21 (4/18/03), is withdrawn due to differentiation of the claimed processes.

(6) Claims 24, 26, 31, 32-36, 38, 43 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al (5,656,337) discussed in Sections 8 and 13 of paper#21 (mailed 4/18/03), in view of Mase et al (4,634,496), as applied in paper# 23 (mailed 11/5/03), or paper 21, sections 6 or 13, respectively. Alternately,

Claims 24, 26, 30-31, 33-36, 38, 42-43 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mase et al, in view of Park et al, and Robertson et (EP-0,630,989A2).

As previously noted, both Park et al and Mase et al concern multilayer dielectric layers for use between interconnects, where Mase et al teach a compositional sequence analogous to

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that claimed and to Park et al's top layer, as the doped glass has similar compositional and chemical considerations to Park et al O₃-TEOS oxide layer (undoped silicate glass) or claimed undoped glass, F-doped glass or Si-C-O-based material. Mase et al however does not teach (inert gas) plasma treating between layer depositions. While Park et al teach plasma treating before subsequent depositing including before their 3rd or final layer which is a silicate glass, emphasizing the importance of the plasma (may be Ar), in order to produce abundance of positive ions on the surface, so as to beneficially effect the subsequent dielectric deposition, their specific example of various Si-containing dielectrics do not include SiC. It would have been obvious to one of ordinary skill in the art, that the plasma treatment technique would have been expected to have been beneficial for effecting any sequence of dielectric deposits as in either Park et al or Mase et al, since effect and uses of charge build up attraction (or repulsion) are common to all dielectrics not just those exemplified in Park et al. Hence, use of the plasma technique in Mase et al, or alternate demonstratively desirable and effective Si-containing dielectrics, such as SiC taught by Mase, in an analogous configuration under the top glass layer of Park et al.

The Newly cited reference to Robertson et al supplied by applicant supports this contention, as it teaches plasma-treating interfaces between deposited layer, with an "inactive" gas, such as Ar, that does not deposit on or adversely effect the surface. Robertson et al teach generically, that such treatment improves the interface between layers for improved adherence and decreased haze and bubbles between deposited layers. They also recommend conducting all steps in the same chamber, and while suggesting possible deposits include Si₃N₄ or α -Si or SiO₂, thus Si-containing dielectrics, they also specifically state their process is expected to be effective for other materials. See the abstract; col. 1, line 1-10; col. 2, lines 45-col. 3, col. 5, lines 35- col.

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6, line 15; col. 8, lines 4-30. Thus given the teachings of Robertson et al for the benefits of plasma treatment analogous to that taught in Park et al, but for between any consecutively deposited layers, such as in Mase et al or Park et al generically, Robertson et al supplies further motivation for use of an intermediate inert gas plasma treatment as in the above combination of Mase et al and Park et al.

It is further noted that specific plasma parameters will vary according to materials used as layer and specific inert gases, as well as particular chamber configuration and frequencies, etc, hence would have been expected to have been determined by routine experimentation.

(7) Noguchi et al (cited in 09/657,392) is of interest for inert gas (Ar, He, Ne, Kr, Xe) plasma treatment between layer depositions of SiC, hence may be considered to supply equivalent motivation to Robertson et al and or Park et al for the expected beneficial effects on silicon carbide, but does not deposit any Si-O-containing layers on the plasma treated SiC.

(8) Applicant's arguments filed on 12/22/03 and discussed above have been fully considered but they are not persuasive. Applicant's arguments with respect to claims 24, 26, 30-31, 33-36, 38, 42-43 and 45 have been considered but are moot in view of the new ground(s) of rejection.

(9) **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

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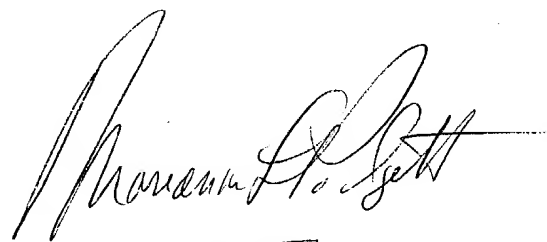
will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

(10) Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. L. Padgett whose telephone number is (571) 272-1425. The examiner can normally be reached on Monday-Friday from about 8:30 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Beck Shrive can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Padgett/LR
February 24, 2004
February 27, 2004



MARIANNE PADGETT
PRIMARY EXAMINER